

SECTION III.—FORECASTS.

FORECASTS AND WARNINGS FOR OCTOBER, 1915.

By H. C. FRANKENFIELD, Professor of Meteorology.

[Dated: U. S. Weather Bureau, Washington, Nov. 2, 1915.]

GENERAL PRESSURE DISTRIBUTION OVER THE UNITED STATES AND CANADA, INCLUDING THE SANDWICH AND ALEUTIAN ISLANDS, ALASKA, AND THE WESTERN PORTION OF THE MIDDLE ATLANTIC OCEAN.

There were no marked departures from the normal pressure at Honolulu during the month. The barometer was somewhat low from the 2d to the 8th, inclusive, moderately high on the 10th, and again moderately low on the 12th-13th. Thereafter nearly normal pressure prevailed until the 27th, when there was a rise that lasted until the 30th, reaching its crest on the 28th. Over the Aleutian Islands, as indicated by the observations at Dutch Harbor, pressure was generally and decidedly above the normal during much of the month, with a principal crest of 30.56 inches on the 4th, another of 30.30 inches on the 17th, and another of 30.36 inches on the 23d. There were also two pronounced depressions—one on the 14th, when the barometer reading was 28.96 inches, and another on the 31st, with a barometer reading of 29.06 inches. The normal reading for the month is 29.65 inches. Over northern Alaska pressures were considerably above the normal during the first decade of the month, after which there was a general and quite well marked depression until the 17th, when another rise set in that continued until the 26th, followed by a moderate fall thereafter. Over southern Alaska pressure was high during the first decade of the month, but generally low thereafter, with the lowest reading on the 20th, when the barometer at Sitka read 28.96 inches, i. e., 0.79 inch below the normal. Pressure was also abnormally low on the 28th and 31st at Sitka.

The Alaskan high pressure of the first decade of the month extended quite generally through the United States and Canada, but the depressions that prevailed over southern Alaska did not extend in marked form below the Canadian boundary, except at the end of the month. As a general rule pressure was somewhat above normal over the United States during the month.

A general depression of moderate character covered the Caribbean Sea and the West Indies on the 28th and 29th and extended into southern Florida and the adjacent Gulf and ocean. No definite center of disturbance was located, however, and by the 31st pressure was rising generally, though slowly.

Since the 6th day of the month reports had been received by radio service from Petropavlovsk, Kamtchatka, latitude 53° 00' north, longitude 158° 39' east, and Anadyr, Bering Sea, latitude 64° 34' north, longitude 175° 35' east. These reports are received through the courtesy of the Russian Government.

STORM WARNINGS.

On the morning of the 1st moderately high pressure over the lower St. Lawrence Valley and New England, with a disturbance of fair character over eastern Ken-

tucky, and a moderate secondary disturbance over southern Virginia, indicated the approach of high easterly winds on the Middle Atlantic and New England coasts and northeast warnings were accordingly ordered at 10 a. m. from Baltimore to Portland, Me., and southwest warnings from Fort Monroe, Va., to Hatteras, N. C. Both disturbances moved slowly northeastward and during the succeeding 24 hours there were easterly gales on the Middle Atlantic and southern New England coasts with a maximum velocity of 68 miles an hour from the east at Delaware Breakwater, Del. At 10:30 a. m. of the 1st northeast storm warnings were also ordered on the Lower Lakes and southern Lake Huron, but the winds that followed were only fresh and the warnings were lowered at 9:30 p. m. On the morning of the 2d the original disturbance was over western New York, while the secondary one was off the New Jersey coast with somewhat increased intensity, and northeast storm warnings were therefore continued at 10:30 a. m. from Narragansett, R. I., to Portland, Me. Northeasterly winds continued during the day on the southern New England coast with a maximum velocity of 60 miles an hour at Nantucket, Mass. There were no other storms of great consequence during the month, although a series of lows passed over the northern portion of the country necessitating storm warnings at various times. In no instances, however, were the high winds resulting from these storms widespread or of unusual velocity. The only gale of consequence that occurred was on Lake Superior on the 7th, at which time there was a pronounced northwestern disturbance over that section with a cold high area of considerable magnitude to the westward. During this storm the wind at Duluth reached a velocity of 52 miles an hour from the west and northwest, and at Whitefish Point, Mich., 46 miles an hour from the east, and the high winds were accompanied by snow flurries. Storm warnings were ordered for this storm on the morning of the 7th.

FROST WARNINGS.

There was but one principal frost period during the month in the Washington district. On the morning of the 6th pressure was rising rapidly in the Northwest following a disturbance that at that time extended from the Texas Pan Handle to northern Minnesota. The disturbance moved northeastward and the high area followed with increasing magnitude and with temperatures that fell much below the freezing point through the northwestern country. On the morning of the 7th the crest of the high-pressure area was over southeastern Montana, with the low center over Lake Superior, and frost warnings were therefore ordered for Tennessee, the Ohio Valley, and northern Indiana. On the morning of the 8th frost occurred as forecast and was heavy in many localities. At this time the western high-pressure area was still increasing in magnitude, with temperatures about 10° below the freezing point, and general frost warnings were therefore issued for the Ohio Valley, Indiana, Ohio, the interior of Pennsylvania, Maryland, the District of Columbia, the interior of New Jersey and Virginia, central and western North Carolina, central and

northwestern South Carolina, and central and northern Georgia. Warnings of freezing temperature were also issued for lower Michigan. On the morning of October 9 it was found that the frost had occurred as forecast and had extended in very light form as far south as central Alabama. The high-pressure area now covered the Great Central Valleys, and it was therefore necessary to issue warnings of heavy to killing frosts, or freezing temperatures, for the entire district north of the thirty-fifth parallel, and warnings of light frost were also ordered for the northern portions of the East Gulf States. Frost occurred as indicated, except along the Middle Atlantic coast. There was no other frost of consequence until the morning of the 25th, when heavy to killing frosts occurred in portions of the Middle Atlantic States. As the season was late and heavy frost had already occurred over this area, no warnings were issued.

DISTRICT WARNINGS DURING OCTOBER.

Chicago forecast district.—On the morning of October 3 frost warnings were issued for southern North Dakota, South Dakota, western Nebraska, and eastern Wyoming. Frost occurred the following morning in western Nebraska and eastern Wyoming, but continued cloudiness prevented frost formation in the Dakotas. By the morning of the 4th a strong high-pressure area was advancing eastward over the eastern slope of the Rockies and the Plains States, and frost warnings were issued for the entire district east of the Rockies, except Illinois and eastern and southern Missouri. These warnings were fully verified in all sections, except near Lake Superior, in part of southern Wisconsin and southeastern Montana, where there was considerable cloudiness. In addition there was light frost in northeastern Missouri and southwestern Illinois. Warnings of frost were issued on the 5th for southern and central Wisconsin, eastern Iowa, Illinois, and Missouri. Frost occurred as predicted, except in northwest Missouri, northeast Iowa, and extreme western Wisconsin, the failure in these sections being due to the rapid southeastward advance of an area of low pressure from the northwest.

This disturbance was followed by another high-pressure area of considerable strength, and on the morning of the 7th warnings of frost were issued for Kansas and Nebraska and frost or freezing temperature for eastern Montana, North and South Dakota. These warnings were fully verified, except in southern Kansas. By the morning of October 7 the pressure had increased to 30.52 inches at Miles City, Mont., and high pressure covered the entire trans-Missouri region, so that warnings of heavy frost were issued for Illinois, Iowa, Missouri, and Kansas, and heavy frost or freezing temperature for Wisconsin,

Minnesota, South Dakota, and Nebraska. Frost, in most sections heavy to killing, occurred generally on the morning of the 8th, except in part of Wisconsin and northeastern Iowa, where cloudiness continued. Snow was falling at some Wisconsin stations. As the pressure was abnormally high (30.68 in. at Pierre, S. Dak.), with low temperatures over the Plains States and upper Missouri Valley on the morning of the 8th, warnings of heavy frost were issued for Illinois, Missouri, Kansas, and eastern Nebraska, heavy frost and freezing temperature for Wisconsin, Minnesota, and Iowa, and a severe freeze in the cranberry marshes of Wisconsin. These warnings were fully verified. There was a severe freeze in northern Illinois, Iowa, and Wisconsin, and much damage was done to the immature corn, which was very late on account of the abnormally cool summer. A temperature of 4°F. was reported at Mather, Wis., and 6° at Grand Rapids, Wis., in the cranberry bogs, and these are probably the lowest readings of record so early in the season. Frost warnings were again issued on the 9th for central and southern Illinois, extreme southeastern Wisconsin and extreme eastern Missouri, with freezing temperature in the Wisconsin cranberry marshes. However, a marked disturbance which moved rapidly southeast from the Canadian Northwest to the upper Missouri Valley, caused a rise in temperature in the upper Mississippi Valley, so that no frost was reported on the morning of the 10th. In the cranberry marshes of Wisconsin there was a hard freeze.

A warning of light frost was issued for western Missouri on the 13th, but failed of verification, and one issued for Kansas on the 25th was verified in the southern half of the State only, light frost being reported from southwestern Missouri also. On the 26th a warning of frost for this portion of Missouri was issued, but none was reported on the following morning.

Killing frosts had occurred at all stations in this forecast district during the first decade of the month, except in southern Illinois, Missouri, and Kansas, so that later warnings were confined to these States.—*Chas. L. Mitchell, Assistant Forecaster.*

Denver forecast district.—No warnings of general importance were issued. The frost warnings were of local interest only.—*F. H. Brandenburg, District Forecaster.*

New Orleans forecast district.—No storm occurred which called for warnings of any importance during the month.

Frost occurred on October 8 in Oklahoma, Arkansas, and northern Texas; for this warnings were issued on the morning of the 7th.—*I. M. Cline, District Forecaster.*

San Francisco forecast district.—No important warnings were issued during the month.—*G. H. Willson, District Forecaster.*